

# BUILDING UP A DAIRY HERD

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INCLUDING ARTICLES ON  
**RAISING THE DAIRY CALF, FEEDING OF  
DAIRY COWS, ANALYSIS OF FEEDS**

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Issued under the Direction of  
**HON. GEORGE HOADLEY**  
Minister of Agriculture



# Building Up a Dairy Herd

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In establishing a herd of dairy cattle the first thing to decide is the breed most suitable to the conditions of the district in which the enterprise is to be established. If it is on improved land in the neighborhood of a town or city and where there is good railway service for the transportation of milk and cream for city use, perhaps one of the recognized pure dairy breeds will be most profitable. If the location is some distance from a town or city and is not favored in the matter of railway facilities but is well favored in the matter of open grazing land, a dual-purpose breed, such as the Dairy Shorthorn, will be most suitable. The character of the enterprise would change in this case to suit the conditions. Butter-making would take the place of direct shipment of milk, and young stock which would be raised for beef would be an important part of the undertaking.

## SELECTION

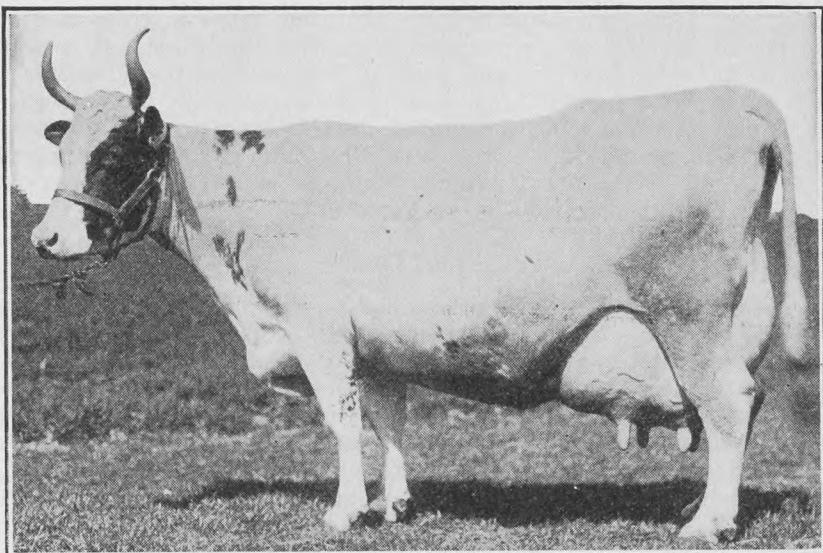
When the breed has been decided on, the next thing is to buy some good grade cows of the breed. It is not advisable to buy pure-breds until experience has been gained in care and management, as the loss of a couple of high-priced cows tends to discourage the owner and drive him out of the business. It is better to buy grade cows at a medium price and put a little extra money in a good sire, thus deriving experience from breeding up a herd. This experience is essential to the successful breeding of pure-bred stock, which is generally the ambition of a good stockman.

## SELECTING A DAIRY COW

In selecting a dairy cow two important points to be considered are constitution and capacity. The dairy cow producing a large supply of milk for ten months in the year is a hard-worked animal and in order to endure this work year after year and produce strong, healthy calves, it is essential to have a strong constitution. A heavy-producing cow must necessarily consume a large amount of food and she must have room to store and assimilate this food for the production of milk.

There are certain characteristics indicated in the form of the cow. The head should show femininity in character and be free from coarseness. The forehead should be broad and the eyes prominent, showing gentle expression. The face should be of medium length, nostrils large (indicating well-developed respiratory organs) and a large mouth indicating ability to consume food. Her neck should be fine and of medium length, blending well into the shoulder. The shoulder should be strong and smooth and free from coarseness. The chest should be broad and deep, giving plenty of room for the vital organs and showing a strong constitution. The ribs should be well sprung and deep, giving depth of

the barrel. The ribs should also be wide apart giving length to the body of the animal and adding to the capacity. The rump should be broad and level, the top line straight, pin bones wide apart and tail fine. The udder is the most important organ of the dairy cow, for this is where the milk is secreted. It should be attached well up behind and extend well forward and should be soft and pliable and free from any hardness or meatiness. The quarters should be uniform and the teats of good size and placed an equal distance apart. The milk veins should be large, long and tortuous, ending in one or more large wells. These well developed milk veins and milk wells indicate that there is a large flow of blood from the udder which is necessary for the secretion of milk.



AYRSHIRE COW

The dairy cow should be possessed of good handling qualities. The skin should be mellow, pliable to the touch and carrying a good coat of hair of fine quality. Her general appearance should be attractive, showing scale and quality. A cow may have all the outward points of a good dairy animal and still not be a heavy producer. There is something which cows possess which stimulates the production of milk and some cows possess this ability to a greater degree than others. It may be some nervous force, but no one can properly explain it. They possess the power to transmit this virtue to their offspring and therefore in selecting our dairy animals it is of vital importance that the records of the ancestors be investigated both as to the percentage of butter-fat and quality of milk given. There are, of course, exceptions to all rules. Sometimes a cow will be an exceptionally heavy producer and the dam and sire possess only ordinary merit, then again the offspring of a sire and dam backed by the highest records will be an ordinary producer, but we must not be affected by the exceptions. It is the rule we must follow, and the strongest law in breeding is that "like produces like."

## **SELECTION OF SIRE**

Too much stress cannot be laid on the importance of selecting the sire as it is through the sire that we look for improvement in the herd. He should be a pure-bred, typical of the breed he represents and should show quality, character and strong constitution. He should be smooth and regular in his lines, free from coarseness and roughness. His head should be strong, denoting character, stamina and prepotency. A bull with a head resembling a female is not likely to impress his qualities on his offspring. He should be broad between the eyes, his face should be of medium length, blending well into the shoulder and the shoulders smooth and free from coarseness. The ribs should be well sprung and deep, giving good heart girth and showing plenty of digestive capacity; the rump level with broad thighs, free from undue meatiness, leaving in his female progeny plenty of room for udder development. His legs should be short, clean and strong and when in motion the bull should be active and stylish. It is important that he should be a good handler, that his skin should be pliable, hair fine and soft to the touch and that the rudimentary teats should be well placed. The bull should be backed by good ancestry. Milk and butterfat records of his dam and as many of his grand-dams as it is possible to get should be carefully investigated.

## **SELECTION OF HEIFERS**

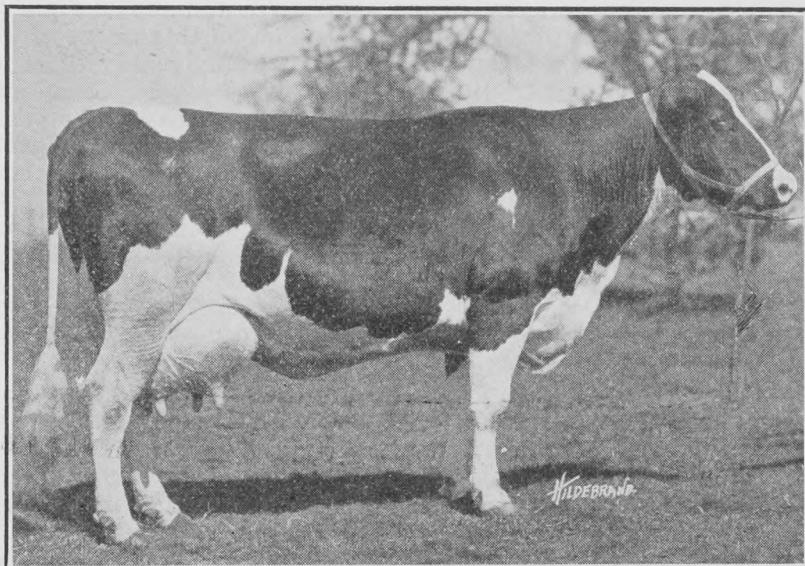
After a good uniform lot of cows of the breed which we have decided suits our purpose or fancy best, and a good bull to mate them with, has been selected, the heifer calves from the best cows should be raised, provided they are thrifty and show a tendency to develop into animals that are typical of the breed. The aim in building up a good dairy herd should be not only to secure high producers but to develop animals that are typical of the breed they represent, that are uniform in appearance, that are of good size and that possess a strong constitution.

A number of breeders of dairy animals in the past have not attached sufficient importance to the type, strength and size of their animals. If success is to be attained the same importance should be placed on these characteristics as on the production of milk and butter-fat.

## **PERFORMANCE AT THE PAIL**

In order to ascertain our best cows, records of each cow's milk and the per cent. of butter-fat should be kept. It takes only a small sum of money to buy a pair of spring scales to hang in the cow-stable. Milk sheet blanks can be had from the Department of Agriculture at Ottawa for the asking. It takes on an average one minute per day per cow to weigh and mark weights and a short time at the end of each month to total the amount. At the end of the year we know just the amount each cow has given. To ascertain the amount of butter-fat the dairyman can get a pint glass milk bottle for each cow for a few cents, put some milk preservative in the bottle, label each bottle with the cow's name, take a sample of each cow's milk morning and evening

of the tenth day, the twenty-first day and the last day of each month, the test being made at the end of each month. Care should be observed in taking the sample that the milk gets well mixed by pouring it from one pail to another before taking the sample. If a cow is not in usual health on test days, no sample should be taken until she is normal. By taking sample on three days each month, one can come very close to the amount of butter-fat produced in a year. By carrying on the work in this manner it is possible to know the good and poor cows and to take a keener and more intelligent interest in the work, besides having the satisfaction and pleasure derived from



HOLSTEIN COW

knowing exactly what each cow is producing. Every year the herd should be carefully culled and the poorer cows eliminated from the herd. It will pay far better to keep ten cows producing ten thousand pounds of milk and four hundred pounds of butter-fat than keep twenty cows producing five thousand pounds of milk and two hundred pounds of butter-fat. The motto of the dairymen should be—better cows, better feed, better care and larger profits.

## Raising the Dairy Calf

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When the calf is first dropped, perhaps the best plan is to allow it to suckle its mother for a day or two in order to get the first milk, or more correctly, colostrum, which is so necessary in cleaning the digestive tract. It can then be removed from the cow to a clean dry place, preferably out of sight of the cow and taught to drink. Care should be taken not to over-feed. A quart or a quart and a half fed two or three times a day is sufficient for the first ten days. After three weeks a little skim milk can be substituted for the whole milk, and when the calf is six weeks old, skim milk alone can be fed. A little flax seed meal may now be boiled into a porridge and a small amount added to the milk to supply the fat which has been taken from the skim milk. Not more than a tablespoonful should be fed at first. This amount can be gradually increased until when the calf is two and a half months old a cupful may be fed. The amount of skim milk can also be increased until a calf consumes 8 or 10 quarts a day. It is not advisable to feed much more than this at any time.

### SUPPLEMENTARY FEEDING

When the calf is a couple of weeks old it should be taught to eat grain. Bran and oats or oat chop, half and half by bulk with a small amount of oil meal added is a suitable ration. A small amount of nice green hay should also be placed before it, but if any feed is left the box should be cleaned before the next meal.

If the calf is expected to develop into a good, strong, useful cow it should be well fed the first winter. It should have skim milk until six months of age and should then receive a liberal ration of grain, preferably oat chop, bran and a small amount of oil meal along with a good quality of roughage. Starve the calves the first winter and the future usefulness of the herd will be greatly impaired.

Feed the calf regularly; use clean pails, always have the milk at the same temperature. Keep the stable dry and clean.

Scours, the most prevalent and deadly of all calf diseases, can generally be traced to one of the following causes; feeding of cold milk, or feeding from a dirty pail, over-feeding or being kept in damp, unsanitary quarters.

It is advisable to keep young calves in the stable the first summer to protect them from heat and flies, but it is important that they get exercise in the yard or paddock night and morning. In the latter part of August or first of September when the days are getting shorter and cooler, they may be turned out to pasture, preferably on Fall Rye and should be brought in to winter quarters in excellent shape. Care must be taken that the heifer is not bred too young, as this will retard her development and sometimes permanently stunt her. At from two and a half to three years old is early enough for the heifer to drop her first calf.

# Feeding of Dairy Cows

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A large percentage of the dairy cows in this Province are unprofitable. This does not indicate that they are all poor individuals. In fact if properly fed, many of these cows would show a profit instead of a loss.

There are two factors which largely control the economical production of milk. One is the adaptability of the cow used for the purpose and the other is the amount and kind of feed given. The problem confronting the dairyman is to produce the largest amount of milk and butter at the lowest possible expense. A man may own the best cows that it is possible to breed, but if they are not properly cared for and fed liberally on the right kind of feed his efforts will result in failure.

When we realize that milk is composed of water, protein, carbohydrates, fat and mineral matter, and that there never was a pound of milk made by a cow except from the food she ate, it can easily be seen how important it is to provide her with large quantities of food containing the constituents which when assimilated will enable the animal to reach her maximum production.

## FOOD CONSTITUENTS AND BODY CONSTITUENTS

If cows are to be economically fed, care must be taken that these constituents be fed in the proper proportion. To make this more plain, if we analyze the cow's body we shall find that it is composed largely of the same constituents as milk.

The animal body contains water to the extent of 50 per cent., and milk contains 87 per cent. This is the reason why water should be supplied regularly and in large quantities.

There are nearly 200 pounds of protein in the body of a 1000-pound cow, and between three and four pounds in 100 pounds of milk. A cow requires about 0.7 of a pound of digestible protein to maintain her body. This is why cows fed on feeds deficient in protein do not give satisfactory results at the pail.

Carbohydrates and fats are both used for the same purpose, that is, to supply heat and energy. Seven pounds are needed each day to keep the animal in good working order; the rest is made into animal fats which are put into the pail or distributed through the body to be used later. In 100 pounds of milk there are generally from 3 to 6 pounds of fat, and about 5 pounds of carbohydrates in the form of milk sugar. From this it will be seen that of all the nutrients carbohydrates are the constituents that are most largely used.

Over 5 per cent. of the animal body and 0.7 or 1 per cent of milk is composed of mineral matter. This is why young animals and also cows giving large quantities of milk should be salted regularly and should be given feeds containing a liberal supply of ash or mineral matter.

Experiments have shown that to produce the maximum amount of milk, cows should be fed on a balanced ration, that is, the digestible nutrients should have a nutritive ratio of 1 to 5 or thereabouts, meaning 1 part protein to 5 parts carbohydrates. Some heavy producers require a narrower ratio, probably 1 to 3 or 4, while others do just as well on a somewhat wider ratio—1 to 6 or 7.

### VARIETY NECESSARY

Cows should be fed not only protein and carbohydrates in right proportion, but these feeds should be palatable, digestible and bulky, and as succulent as it is possible to get them. The cow also relishes and does better on a variety of feeds. The problem confronting the dairyman in this Province is to supply the variety and succulence through the long winter months.

The feeds that are generally used by the dairyman in this Province through the winter months are: first for roughage; green-feed, prairie hay, tame hay, and in some districts, alfalfa and ensilage. Silos are now becoming numerous in various parts of the Province.

For concentrates: ground oats, barley, frozen wheat, bran and oil cake, are used.

### ROUGHAGE

Our rough feeds are high in carbohydrates, and low in protein, green-feed having about 9 pounds of protein out of every 100 pounds, prairie hay 6 pounds, and timothy hay  $5\frac{1}{2}$  pounds. Of this amount, however, only about half of the protein is digestible. If alfalfa can be grown it will do much to balance the rough feeds. Alfalfa contains about 14 pounds of protein in every 100 pounds, and of this 10 pounds is digestible.

### CONCENTRATES

To get the best results from dairy cows some concentrates must be fed, because a cow cannot consume enough of the rough feeds to produce a large amount of milk and she will not get the variety to stimulate her appetite. The concentrates grown in this country are fortunately high in digestible protein, besides being very palatable.

**Oats.** Oats is one of the most largely grown crops in the West and is one of the best feeds for any kind of stock. It is especially good for the dairy cow. It is bulky and palatable, and though containing a larger percentage of indigestible material than the other grains owing to its heavy hull, it also contains a larger percentage of digestible protein and fat and has a nutritive ratio of 1 to 6, which is almost a balanced ration.

**Barley.** Another feed largely grown in Western Canada and which should command greater attention from the dairyman is barley. Barley according to analysis is very similar to corn, and for this reason forms a large part of the fattening hog's ration in this country. It can be fed very profitably to dairy cows, but like corn should only be fed in limited quantities. Barley adds variety and when ground should be mixed with more bulky feeds, such as ground oats and bran. It is highly digestible, containing 75 per cent. digestible nutrients against 66 per cent. in oats. It is lower in protein and fat, but higher in carbohydrates.

**Wheat.** Wheat is valuable feed for dairy cows but on account of the high value placed upon it for human food, is not much used. Shrunken and immature wheat is plentiful in some seasons and can be profitably utilized. Wheat is equal pound for pound to barley, and should occupy the same place in the ration. The great value of wheat for feeding purposes is in its by-products, of which bran is the most important to the dairyman. Bran is not so highly digestible as some of the other feeds, but is extremely valuable for its physical nature, being bulky, palatable, and having a cooling effect on the digestive system. It has also a laxative effect, owing to the large amount of phosphorus or mineral matter in its composition. Bran contains only 56 per cent digestible nutrients and would be an expensive feed were it not for the reasons already mentioned. However, it is high in digestible protein, containing 12 per cent.

**Flax.** Another feed worthy of mention is flax, but on account of containing a large percentage of oil it is rather expensive. Like wheat its greatest value as a dairy feed is in its by-products, chief of which is oil meal. This feed has also a high corrective value, especially when animals are fed on dry feeds. It keeps the digestive organs in healthy working condition. It is highly digestible and contains a larger percentage of protein and fat than any of the other feeds spoken of. It contains about 30 per cent. protein and 6 per cent. fat, and for this reason should only be fed in small quantities in conjunction with bulky feeds.

**Rye.** Rye is a feed grown extensively in the West and has a high value for fattening hogs. It is carbonaceous in character and is palatable, but its chief objection in the dairy ration is the disagreeable flavor it imparts to milk and the bitter taste it develops in butter if fed in any considerable quantity. A danger from it is the likelihood of its being affected with ergot, which causes abortion. Its best use for dairy cows is when sown for pasture. If it is sown in the month of July it will be ready to turn the stock on by the middle of August or first of September, thus supplying green succulent feed when the other grasses are dried up. It also comes on early in the spring and can be pastured until June, the cattle being taken off when the rye starts heading out, to escape the effect of ergot which may be present. The rye can then be left for grain, or if it has been pastured too close the land can be cultivated as a summer-fallow or sown to green-feed. Rye should not be used solely for pasture for dairy cows as a strong flavor sometimes develops in the milk and butter, but if the cows can have access to some other pasture as well, no unsatisfactory results are likely to occur.

If it is impracticable to have pastures arranged in this manner then it is better to have the cows turned on the rye for a few hours immediately after milking.

### SUCCULENT FEEDS

To get the best results from dairy cows during the winter months some kind of succulent feed should be supplied. This succulent feed has the advantage of being not only highly palatable but has a cooling effect on the digestive organs which enables them to make better use of the concentrates. This succulence can be supplied by the use of roots or ensilage, or both.

**Roots.** Large crops of roots can be grown in any part of the Province where there is sufficient moisture. The soil of Alberta is well adapted to the growing of this crop, but the chief objection is the cost of handling and a suitable place for storage.

### SILO

The use of the silo is becoming more and more recognized as a cheap means of obtaining food supply. Different crops may

be used for the making of ensilage. The crops in Alberta used for this purpose are corn, alfalfa, green oats, peas, and sunflowers, or a combination of two or more of these crops mixed together when filling the silo. In Eastern Canada corn is the principal ensilage crop, but in Alberta it has not been grown to any extent except in the southern part of the Province. Alfalfa has only been grown successfully in certain parts of the Province, but on account of the high prices paid, alfalfa hay has been little used as an ensilage crop.



Silo at Stony Plain Demonstration Farm

and on small farms under an intensive system of cultivation it will probably be generally grown, as a larger tonnage per acre can be secured from it than from any other crop. In the southern districts, sunflowers will undoubtedly occupy a prominent place in the rotation, as this plant stands dry conditions well, and if early varieties are planted and the crop put in rows three feet apart and well cultivated the seeds will mature, thus greatly improving the feeding value of the plant. The crop should be sown early and the land well cultivated between the rows every few days

The sunflower as an ensilage crop has lately come into prominence

to form a mulch, thus preventing evaporation of moisture from the soil and also checking weed growth. In the northern parts of the Province where the season is shorter and more danger of early fall frost the sunflower crop has not the same chance to mature and at the time of filling the silo it may be advisable to mix in some fairly well matured oats with the sunflowers.

Green oats or a mixture of green oats and peas is the principal crop used for ensilage in the Province up to the present time. This grain can be put in after the regular spring crops have been sown and in the fall the silo can be filled after the grain crop has been cut and stooked and before threshing commences. If the soil is properly tilled a heavy crop can be secured, and can be handled with less labor than hoed ensilage crops.

In feeding dairy cows attention should be paid to the relation between the concentrates and the quality of rough feed being fed. For instance, if well cured clover or alfalfa hay, and well matured corn ensilage formed the roughage in the ration, a smaller amount of concentrates might be fed and especially the concentrates which have to be purchased, such as bran and oil cake. If prairie hay and green-feed formed the roughage in the ration, more concentrates would be needed and especially those of a cooling nature and high in protein content. Some cows will consume and assimilate a larger amount of concentrates than others so that no hard and fast ration can be applied to all cows, but where a good quality of roughage is used one pound of concentrates for every four pounds of milk given by the cow is a fairly safe ration to follow.

### LIBERAL FEEDING

While it is important to have a knowledge of the different kinds of available feeds, and know how to make up a balanced ration, the more liberal feeding of our live stock is essential if we are going to develop our young animals and get the production from our mature milk cows that will yield us a profit. Too many of our dairy animals are poorly fed and cared for. It is poor economy to pay high prices for well bred cattle and then provide them with insufficient food and poor shelter, for with this treatment well bred animals will soon become scrubs. The dairyman should not keep more stock than he can feed and care for properly. There is more satisfaction and greater profits in keeping a small or medium sized herd in good condition than a large herd poorly fed and cared for.

Cows are creatures of habit and for this reason they should be fed and milked regularly. The good dairyman is particular to feed and milk his cows at the same hour each day. If cows are milked at different hours each day and this treatment continued, their production will soon be seriously lessened.

For a cow to keep up her maximum production year after year it is necessary that she have a rest between lactation periods. A rest of about two months is what she requires and during this dry period she should be fed liberally to put her in condition for next year's work. If a cow is thin and in poor condition at time of freshening she will be unable to make a satisfactory record the coming season.

# Analysis of Feeds

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## ALFALFA

### (Composition)

Water . . . . .	8.1
Ash . . . . .	8.8
Protein . . . . .	14.6
Carbo-hydrates . . . . .	66.4
Fat . . . . .	2.1

### (Digestible)

Protein . . . . .	10.5
Carbo-hydrates . . . . .	40.5
Fat . . . . .	.9

## CORN

Water . . . . .	42.2
Ash . . . . .	2.7
Protein . . . . .	4.5
Carbo-hydrates . . . . .	49.
Fat . . . . .	1.6

Protein . . . . .	2.5
Carbo-hydrates . . . . .	34.6
Fat . . . . .	1.2

## ENSILAGE

### (Immature Corn)

Water . . . . .	79.1
Ash . . . . .	1.4
Protein . . . . .	1.7
Carbo-hydrates . . . . .	17.
Fat . . . . .	.8

Dry matter . . . . .	26.4
Protein . . . . .	1.4
Carbo-hydrates . . . . .	14.2
Fat . . . . .	.7

## OAT HAY or GREEN FEED

Water . . . . .	14.0
Ash . . . . .	5.7
Protein . . . . .	8.9
Carbo-hydrates . . . . .	68.6
Fat . . . . .	2.8

Protein . . . . .	4.7
Carbo-hydrates . . . . .	36.7
Fat . . . . .	1.7

## PRAIRIE HAY

Water . . . . .	9.2
Ash . . . . .	7.8
Protein . . . . .	6.2
Carbo-hydrates . . . . .	74.0
Fat . . . . .	2.8

Protein . . . . .	3.0
Carbo-hydrates . . . . .	42.9
Fat . . . . .	1.6

## SUNFLOWER ENSILAGE

(Composition)	(Digestible)
Water . . . . .	76.91
Ash . . . . .	.2
Protein . . . . .	3.23
Carbo-hydrates . . . . .	18.97
Fat . . . . .	.69

## OAT ENSILAGE

Water . . . . .	67.1
Ash . . . . .	2.48
Protein . . . . .	4.35
Carbo-hydrates . . . . .	24.60
Fat . . . . .	1.47

## TIMOTHY HAY

Water . . . . .	14.2		
Ash . . . . .	4.4		
Protein . . . . .	5.7	Protein . . . . .	2.5
Carbo-hydrates . . . . .	72.7	Carbo-hydrates . . . . .	39.2
Fat . . . . .	3.0	Fat . . . . .	1.5

## LINSEED MEAL

Linseed Meal has a physical value, especially when animals are fed on dry feeds, in keeping the digestible apparatus in healthy working condition.

Indigestible Nutrients . . . . .	15.6	Digestible Nutrients . . . . .	69.1
Ash . . . . .	5.5	Water . . . . .	9.8
		Protein . . . . .	30.2
		Carbo-hydrates . . . . .	32.0
		Fat . . . . .	6.9

## BARLEY

Indigestible Nutrients . . . . .	11.4	Digestible Nutrients . . . . .	75.3
Ash . . . . .	2.5	Water . . . . .	10.8
		Carbo-hydrates . . . . .	65.3
		Fat . . . . .	1.6
		Protein . . . . .	8.4

## OATS

Indigestible Nutrients . . . . .	20.0	Digestible Nutrients . . . . .	66.3
		Water . . . . .	10.4
		Protein . . . . .	10.1
		Carbo-hydrates . . . . .	52.5
		Fat . . . . .	3.7

### **BRAN**

Indigestible Nutrients . . . . .	25.9	Digestible Nutrients . . . . .	56.4
Ash . . . . .	5.8	Water . . . . .	11.9
		Protein . . . . .	11.9
		Carbo-hydrates . . . . .	42.0
		Fat . . . . .	2.5

### **RYE**

Indigestible Nutrients . . . . .	9.1	Digestible Nutrients . . . . .	80.1
Ash . . . . .	2.1	Water . . . . .	8.7
		Protein . . . . .	9.5
		Carbo-hydrates . . . . .	69.4
		Fat . . . . .	1.2

### **WHEAT**

Indigestible Nutrients . . . . .	9.9	Digestible Nutrients . . . . .	77.8
Ash . . . . .	1.8	Protein . . . . .	8.8
		Fat . . . . .	1.5
		Carbo-hydrates . . . . .	67.5

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Edmonton: Printed by J. W. Jeffery, King's Printer

